standard periodicals, of which complete sets are supposedly available in these libraries does not cover the case. The United States at least is afflicted with several scientific periodicals of avowedly general nature, and some of the special journals have a none too stable editorial policy. Some of these special journals moreover still further complicate bibliographical work by permitting the publication of abstracts of work which at some time may be judged worthy of adequate publication, thus cluttering their indices beyond the point of convenience if not utility.

If then our libraries, even our special libraries, are to approximate completeness in their indices of current published scientific material they should have the assistance of the investigators themselves, at least to the extent of supplying them with such articles as are reprinted for private circulation. It is an almost universal custom for investigators to distribute reprints of their own papers among their colleagues. To add to these private mailing lists the names of the fifty leading libraries of this and other countries would mean some trouble and some slight expense. The time and cost thus involved would however be a very small fraction indeed of that expended in the prosecution and publication of the work and the insurance thus purchased that the papers would be cared for and made more available to this and succeeding generations would be well worth the investment.

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THE FUR SEALS

TO THE EDITOR OF SCIENCE: In an interesting and suggestive article on the "Rescued Fur Seal Industry" in SCIENCE for July 23, Mr. W. T. Hornaday states that "man's so-called management (of the herd) lies solely in the use of the seal killer's club and the skinning knife." This is not quite the whole truth, for while the behavior of individual animals in feeding, breeding, or migration is beyond human control, man can do something to increase the numbers. In the nineties, most of the young seals lying on sandy "rookeries" were killed by the hookworm (*Uncinaria lucasi*). Those on the rocks were virtually immune and as the shrinkage of the herd, before its rescue took them practically all off the sands, no "wormy pups" are lately reported. In 1897, the Commission of that year gather up—and mostly burned—12,000 "pups" that had been weakened by the hookworm and then trampled by the bulls. In that year we had several sandy patches in Zapadni rookery covered by rocks, and we suggested fencing the animals away from the great sand flat of Tolstoi. To cover or fence up sandy areas is a possible factor of "management."

Another is the extirpation of the "idle bulls" which surround the rookeries and raid the harems, killing many females and young. Ninety per cent. or more of the males of this polygamous species are wholly superfluous. In the recent absurdly needless "five years closed season" these have accumulated to the danger point. I am told that an order has now been given for the shooting of 7,000 of them.

The protection of the females from killing on land and sea may be also regarded as a phase of "management."

Whether other islands could be stocked from the Pribilofs has never been tested. On these islands there is ample breeding space for millions more, and there is no evidence of food shortage outside.

DAVID STARR JORDAN

A PRELIMINARY NOTE ON THE GERMINATION OF UROPHLYCTIS ALFALFÆ

RESTING spores from decaying galls of alfalfa crown-wart have been observed to germinate in water cultures. The globose resting spores, depressed on one side, are 38–42 by 30 microns in diameter. They produce from one to fifteen or more zoosporangia which escape through irregular fissures in the brown walls. The zoosporangia vary in diameter from 10 to 40 microns. Zoospores leave the sporangia through short tubes projecting about 2 microns from the hyaline wall, with

an opening of about 2 microns in diameter. There are usually four or five tubes in large sporangia and one tube in small sporangia.

The zoospores are somewhat ovoid in form, 4 to 8 microns in length and very flexible. The single cilium, 30 to 50 microns in length, is attached at the broader posterior end and trails behind when the spore is actively swimming. There is usually one bright eyespot, but there may be two. Conjugation of zoospores has not been seen in my cultures.

Within twelve hours after leaving the sporangia most of the zoospores settle down at the margin of the hanging drop and become rounded in form. A single germ tube develops and grows out from the edge of the drop and along the surface of the cover glass. If the spore has come to rest too far from the margin, the mycelium grows downward and projects from the drop of water. The tube may reach a length of 10 to 20 microns in 24 hours after the zoospore has left the sporangium. The mycelium usually branches freely and irregularly after it reaches a length of about 10 microns. In cultures 9 days old the mycelium averaged about 20 microns in length. It varied from 10 to 60 microns (total length of branches).

Old galls are likely to contain nematodes, Paramœcium and other ciliate protozoa, several kinds of flagellates and amoeboid protozoa. Some of these feed on the zoospores, as many as 30 having been counted in a single Paramœcium. Cultures free from these organisms were obtained by transferring ripe sporangia, by means of a mechanically operated micropipette, into hanging drops of water. The zoospores escaped from the sporangia and sent out germ tubes in these cultures.

Much difficulty was encountered in finding galls with spores that would germinate. Even in such galls, only a very small percentage of the resting spores germinated. In some cases the zoospores escaped when the hyaline wall was extruded only slightly through the fissure in the brown wall. Usually the sporangium became entirely free before the spores were released.

Hanging drop cultures of spores from several galls produced sporangia for about two weeks. Attempts to hasten the release of zoospores by keeping these cultures on ice over night were not successful. Cultures containing sporangia were allowed to become partially dry for a few minutes and then moistened again. This effected the escape of zoospores from ripe sporangia. It did not change sporangia appreciably in which the contents had not become differentiated into spores.

Germination was obtained in November (1906) and in March, April, May, June and July (1920).

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SCIENTIFIC BOOKS

Hand-List of Scientific Manuscripts in the British Isles dating from before the Sixteenth Century. By Dorothea Waley Singer. London, De La More Press, 1919. 8o. 12 pp.

Survey of Medical Manuscripts in the British Isles dating from before the Sixteenth Century. By Dorothea Waley Singer. London, J. Bale, Sons & Danielsson, Ltd., 1920, 8o, 12 pp.

These are important contributions to the early history of medieval medicine and science, the first fruits of a catalogue of some 30,000 scientific manuscripts of the Middle Ages, found in Britain, and now in preparation by Dr. Singer and his wife. The value of such a catalogue to future students will be incalculable, going forward as it does simultaneously with the cataloguing and intensive study of the scientific and medical incunabula. As the social and scientific history of modern medicine is to be found largely in the files of medical periodicals of the eighteenth to the twentieth centuries, so the unwritten history of medieval science is contained in the manuscripts, the pathway to which lies through the early printed books.